



DCC 101

What is DCC

Digital Command Control allows you to operate multiple locomotives, independent of each other, at the same time with varying speeds and directions on the same electrically controlled section of track.



DCC 101

How Does It Work

Each locomotive is equipped with a decoder that receives packets of information via the rails.

If the packet address matches the decoder address, the locomotive responds to the instructions contained in the packet.

If the addresses do not match, the instructions are ignored.

The instructions control speed, direction and light control.

In the case of sound decoders, additional information like bell, horn, additional light controls and other functions would be included.



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Getting Started - Basic Components

Command Station – Controller that creates packets of information in the DCC format and provides a bus for throttle connection.

Power Supply – Transformer that converts 120VAC to 15VAC

Booster – Device that combines the AC power from the power supply to the DCC packet information from the command station and provides connection to the track. Boosters can be used to isolate sections of track during short circuits.



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Getting Started - Basic Components

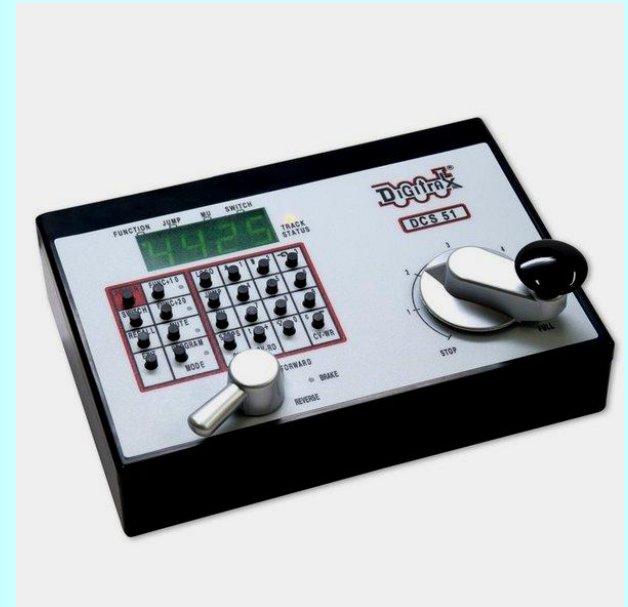
Throttle – Device that allows the operator to control the functions of the decoder equipped locomotive. Throttles can be tethered or wireless.

Decoders – Devices that reside in the locomotives. They receive instructions from the packets via the track and convert the information into control signals for the motor, lights and other functions.

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Command Stations

Basic command stations can be simple and inexpensive and can combine the booster and throttle into one enclosure. They usually limit the number of locos that can run simultaneously and have a limited power output. \$150 - \$250



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Command Stations

Intermediate stations may only package the controller and booster into one enclosure. They allow more locos to be run simultaneously and have a larger power output. Handheld throttles are used with these systems. \$300 - \$450





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Command Stations

Large systems have separate components. They can support lots of throttles and locomotives and have very large power outputs. \$400 - \$650



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Power Supplies





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Boosters





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Throttles

Basic throttles are usually tethered with a minimum number of features.





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Throttles

Super throttles are almost always wireless and can be infrared or radio. They double as the command station controls and have features like macros and programming capability. They can usually control multiple functions and in some cases multiple locos.





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Decoders

Decoders come in many shapes, sizes and prices

Price is usually determined by the number of functions they can handle with sound decoders being the most expensive.

Operating parameters are stored in locations called Configuration Variables (CVs)



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Decoders

Each CV has a predetermined function and the data stored there controls how the locomotive responds to the instructions received in the packet.

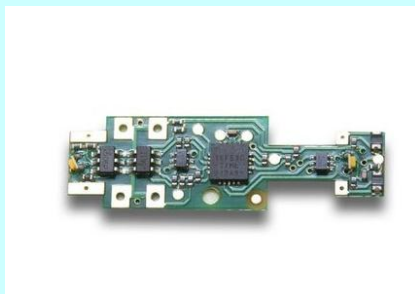
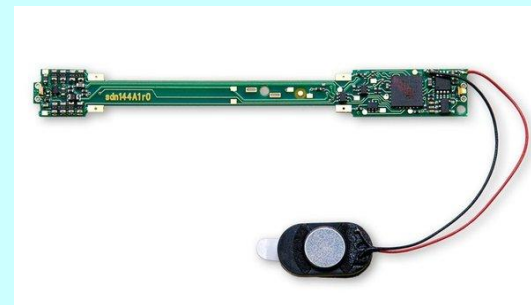
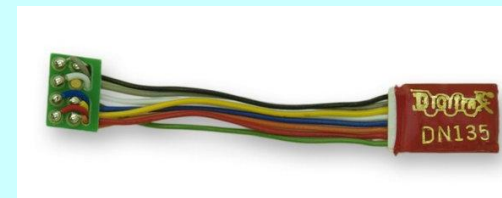
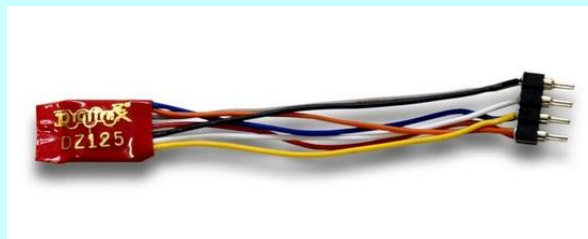
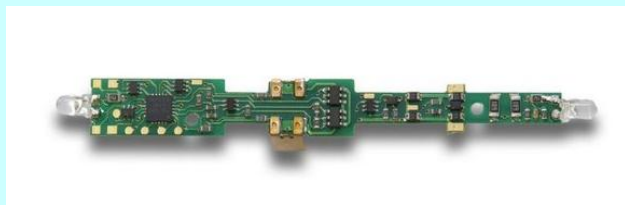
Some CVs have the same function, determined by NMRA standards, that all manufacturers adhere to.

Other CVs functions are left to the discretion of the manufacturer, so always keep the literature supplied with your decoder.



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Decoders





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Some Advantages

Since decoders conform to NMRA standards, locos will run on any DCC system, regardless of manufacturer.

DCC greatly simplifies layout wiring which reduces cost and time to implement.

Although most DCC systems can be operated through a computer, no computer experience is required to operate DCC.

Multiple users can be running different multiple operations at the same time.



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Some Advantages

Basic starter systems are inexpensively priced and easy to expand.

Control panels can be simplified or eliminated by using throttles to control accessories and turnouts.

With wireless throttles, you can walk around and control your train instead of your track.



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Some Advantages

With DCC, you can:

- Fine tune locomotive performance

- Adjust start voltage/maximum speed

- Speed match for good MU operation

- Smooth steam loco operation with .Torque Control.

- Prototype Lighting effects such as:

 - Dimming

 - Mars, Strobes, Beacons, firebox flicker

 - Operating ditch lights

- Sound and all the bells & whistles that go with it



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What System Should I Buy?

How big will the layout be?

How many loco's will I run at the same time?

How many industries and yards will I want?

Will I run operating sessions?

How many operators can I support?

What scale will I run?



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Things to consider:

Number of power districts

Determined by sheer size, number of yards, number of industries or number of locomotives running at the same time. Allow 1/4 - 1/2 Amps per locomotive.

Number of boosters

Determined by number of power districts or divided by function. About 8-10 locomotives per 5 Amp booster.



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Things to consider:

Current capability of the system

3 Amp systems adequate for most N scale layouts.

5 Amp systems adequate for HO and S scale

10 amp boosters are not for HO. Use on O and G scales



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Things to consider:

Number of throttles to purchase.

Determined by number of trains running at one time or the number of operators per ops session.

System Capability

Number of throttles supported

Number of addresses supported

Fast clock for operations

Number of functions supported

Macros and accessories supported



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Don't buy anything until you've done enough research to determine what will work for YOU.

Check out different clubs to see how they do it.

Layout tours also allow you to see how other home size layouts operate.

Club websites can be found at
<http://www.dfwtrainshows.com/>



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Some Manufacturers - Systems

BACHMANN DCC – EZ DCC

CVP – AIRWIRE, EASY DCC

DIGITRAX - ZEPHYR, SUPER EMPIRE BUILDER, SUPER CHIEF

ESU LOKSOUND - LOKSOUND ECoS LS-NAVIGATOR

LENZ CONTROL SYSTEMS - SET 90, SET 100

MRC – EXPRESS, PRODIGY

NCE DCC – POWERCAB, PH-PRO SYSTEM



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Some Manufacturers - Decoders

DIGITRAX - MOBILE DECODERS

DIGITRAX - SOUND DECODERS

ESU LOKSOUND - MOBILE DECODERS

ESU LOKSOUND - MOTOR/SOUND DECODERS

LENZ - MOBILE DECODERS

MRC – MOBILE DECODER

MRC – MOTOR/SOUND DECODERS

NCE MOBILE DECODERS

SOUNDTRAX - MOBILE DECODERS

SOUNDTRAX - TSUNAMI MOTOR/SOUND DECODERS

TRAIN CONTROL SYSTEM - MOBILE DECODERS

TRAIN CONTROL SYSTEM - FUNCTION ONLY DECODERS



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Questions and Answers